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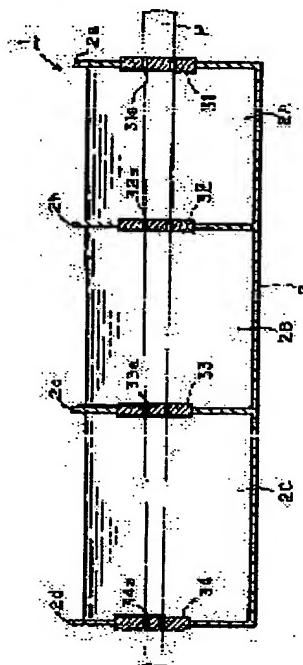
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## (54) MANUFACTURE OF WIRE PROTECTING MEMBER AND DEVICE USED IN THE SAME

### (57) Abstract:

**PROBLEM TO BE SOLVED:** To provide a method for continuously and efficiently manufacturing a well workable wire protecting member and a device used in this method.

**SOLUTION:** A synthetic resin P in a semi-melted condition extracted out of a die from an extruder are fed into a plurality of forming dies 31-34 arranged in a water tank 2 at preset spaces in sequence and gradually drawn into a rolled form, and cooled by a water in the water tanks 2A, 2B, 2C. As a result, the inner and outer periphery faces of the synthetic resin P are cooled with a temperature difference and a wire protecting member in the rolled form is free from winding characteristics due to inside residual stress.



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**CLAIMS****[Claim(s)]**

[Claim 1] The elastomer of the half-melting state extruded from the dice of an extruding press machine, or the synthetic resin of an olefin system While narrowing down to the cartridge to which a part of sending and circumference lapped with two or more dices for fabrication arranged by having a predetermined interval in the tank one by one the electric wire protection characterized by making it make the electric wire protection member which has, cooled and was fabricated [temperature gradient] in the shape of a roll in the inner skin and the peripheral face of synthetic resin by carrying out cooling solidification gradually in this state produce the curliness by internal residual stress — the manufacture method of a member

[Claim 2] It is equipment which manufactures a roll-like electric wire protection member continuously by the synthetic resin which was allotted between the extruding press machine and the taking over machine, and was extruded from the extruding press machine. the above-mentioned equipment It consists of two or more dices for fabrication attached in the side attachment wall and the aforementioned septum of the tank in which the interior was divided into plurality, and a tank by the support. to the above-mentioned dice for fabrication the electric wire protection characterized by preparing swirl-like opening, respectively, and setting up opening of a parenthesis so that the path may become small gradually toward what was located in the taking over machine side from what was located in the extruding-press-machine side — the manufacturing installation of a member

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DETAILED DESCRIPTION

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## [Detailed Description of the Invention]

## [0001]

[The technical field to which invention belongs] this invention relates to the equipment used for the method of manufacturing the electric wire protection member attached in the circumference, and this method, in order to mainly protect the fictitious distribution line.

## [0002]

[Description of the Prior Art] Generally, as the fictitious distribution line, although the cable was used, covering around this cable had a possibility of a worker having touched and causing unexpected accident, when it should have been easy to hurt and this covering should have been torn from outdoor various environment \*\*(ing), and the tension at the time of the construction to a telegraph pole, a steel tower, etc. acting, or the power transmission high voltage always \*\*(ing).

[0003] Then, the electric wire protection member formed in the circumference of an electric wire by the insulating material was attached a part [ a part with a possibility that a worker may touch ], for example, the telegraph pole for electric wire construction, and a steel tower near. This electric wire protection member is formed in tubed [ with which a part of band-like or circumference was opened wide ] by rubber, the resin of an elastomer system, etc., and is attached in this electric wire by being fixed by metallic ornaments etc., where an electric wire is wound.

[0004] In here, this kind of electric wire protection member was conventionally manufactured by extrusion molding or injection molding.

## [0005]

[Problems to be Solved by the Invention] the conventional electric wire protection which mentioned above — since it had elasticity, the electric wire protection member manufactured by this method although fabrication-operation efficiency was high, since extrusion molding could work continuously first by the manufacture method of a member was a band-like thing, and this twisted around an electric wire, alone the work to fix could not perform it easily and it had the trouble that the electric wire protection member which was excellent at handling nature cannot manufacture.

[0006] Moreover, by this method, although the electric wire protection member which curved to the arc could be manufactured in injection molding so that it might be easy to cover an electric wire, when it was not able to fabricate continuously and fabricated to a cartridge, the work which puts a break into lengthwise was also needed after fabrication, and there was a trouble that fabrication operation efficiency was bad. And since the electric wire protection member manufactured by this method was restricted to the thing of a fixed configuration and a size, it also had the trouble that the candidate for use was limited.

[0007] the above-mentioned electric wire protection of the former [ this invention ] — the trouble which the manufacture method of a member had tends to be solved and it is going to offer the equipment used for the method of manufacturing with the electric wire protection member excellent in workability continuously, and this method

## [0008]

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, invention according to claim 1 among this inventions electric wire protection — the elastomer of the half-melting state extruded from the dice of an extruding press machine, or the synthetic resin of an olefin system about the manufacture method of a member While narrowing down to the cartridge to which a part of sending and circumference lapped with two or more dices for fabrication arranged by having a predetermined interval in the tank one by one By carrying out cooling solidification gradually in this state, the inner skin and the peripheral face of synthetic resin have a temperature gradient, and are cooled, and it is characterized by making it make the electric wire protection member fabricated by this in the shape of a roll produce the curliness by internal residual stress.

[0009] Moreover, the tank in which the interior was divided into plurality by the septum in the equipment which manufactures a roll-like electric wire protection member continuously by the synthetic resin which invention according to claim 2 was allotted between the extruding press machine and the taking over machine, and was extruded from the extruding press machine. It constitutes from two or more dices for fabrication attached in the side attachment wall and the mentioned septum of a tank to this dice for fabrication Whorl-like opening prepares, respectively and it is characterized by setting up opening of a parenthesis so that the path may become small gradually toward what was located in the taking over machine side from what was located in the extruding-press-machine side.

## [0010]

[Embodiments of the Invention] Hereafter, based on the state of operation illustrating this invention, it explains in detail.

[0011] drawing 1 — the electric wire protection of this invention — it is the simplest cross section having shown the operating state of the equipment used for the manufacture method of a member. This equipment 1 is installed between an extruding press machine (not shown) and a taking over machine (not shown), and as illustrated, it attaches the dices 31, 34, 32, and 33 for fabrication in this high position of the side attachment walls 2a and 2d before and behind the tank 2 in which the interior was divided into plurality by Septa 2b and 2c (it sets to drawing 1 and they are right-hand side and left-hand side), and Septa 2b and 2c, respectively. These dices 31-34 for fabrication have the whorl-like penning 31a-34a (refer to drawing 2), respectively. And in drawing 1, toward the thing of a right-hand side thing to left-hand side, these penning 31a-34a have the small path of the whorl, namely, gradually, they are set up so that the size (L-shape to drawing

2) of the portion which overlapped the vertical hoop direction may become large.

[0012] In addition, the water temperature in each tank 2A classified by Septa 2c and 2d, 2B, and 2C is controlled from the entrance side (right-hand side) to become low gradually toward an outlet side (left-hand side).

[0013] next, the electric wire protection of this invention using the above-mentioned equipment 1 — if the manufacture method of Member Pa is explained, heating melting of the synthetic resin of an elastomer system or an oil fin system is carried out with the extruding press machine (not shown) first installed in the entrance side (it sets to drawing 1 and is right-hand side) of a tank 2, and this will be made band-like or band-like [curved], and will be extruded continuously. And this is sent in tank 2A through the dice 31 for fabrication. By this, it is fabricated by the configuration which curved to the abbreviation cartridge for the dice 31 for fabrication, while passing through the inside of tank 2A, it is cooled gradually, and the synthetic resin P of the half-melting state extruded from the extruding press machine is sent into the following dice 32 for fabrication. And the synthetic resin P of the half-melting state which was narrowed down so that the degree of the curve might become strong further for this dice 32 for fabrication, did in this way, and was extruded from the extruder. While passing each tank 2A, 2B, and 2C and cooling solidification is carried out gradually, the configuration is gradually prepared for each dice 31, 32, 33, and 34 for fabrication, and, finally it is fabricated in the shape of a roll, and is drawn out by the taking over machine from the outlet side (it sets to drawing 1 and is left-hand side) of a tank 2, and the electric wire protection of the shape of a roll as shown in drawing 3 by cutting the synthetic resin P of the shape of a pulled-out roll in a straight position — Member Pa is manufactured.

[0014] Since it passes through the inside of tank 2A, 2B, and 2C in the process of the above-mentioned cooling by the manufacture method of this invention at this time where the synthetic resin P of a half-melting state is rolled in the shape of a roll, although the peripheral face is cooled comparatively promptly in contact with tank 2A, 2B, and a lot of water in 2C. The water included in the interior rolled in the shape of a roll cannot convect easily, and from this, the water of this part will receive the heating value at the time of cooling synthetic resin P, and will be kept comparatively high. By this, the inner skin and peripheral face have a temperature gradient, and the synthetic resin P wound in the shape of a roll will be cooled. And when internal and external temperature reaches equilibrium, the residual stress by heat distortion will produce the synthetic resin P cooled by having a temperature gradient both at home and abroad in this way in the interior. therefore, the electric wire protection fabricated in the shape of a roll in this way — Member Pa tends to return to the configuration of the origin immediately wound in the shape of a roll, even if the property which maintains this configuration further becomes strong and develops with the curliness by internal residual stress.

[0015] the electric wire protection of the shape of a roll with the curliness according to internal residual stress with this invention method as mentioned above — Member Pa can manufacture continuously by extrusion molding.

[0016] and the electric wire protection manufactured by doing in this way — if Member Pa extends both-sides edge Pa' which was rolled in the shape of a roll and overlapped, and Pa" and puts them on an electric wire (not shown) — an above-mentioned passage — this electric wire protection — since Member Pa has curliness, it coils around the circumference of an electric wire and it is held. Therefore, if it fixes using the fixed metallic ornaments which do not illustrate the circumference so that it may separate in this state or may not move, it can attach in the position of a request of an electric wire easily.

[0017] thus, the electric wire protection manufactured by this invention method — Member Pa is attached in an electric wire and used for a short circuit or prevention of an electrical shock.

[0018] as mentioned above, the electric wire protection manufactured by this invention method — since it can obtain the thing of the desired length easily, and coils around an electric wire in the shape of a roll, since that by which extrusion molding was carried out is cut in a desired position and Member Pa forms it, and it is attached, it cannot choose the difference in the path of an electric wire, but can respond to the difference among the various conditions in an attachment work site.

[0019]

[Effect of the Invention] the electric wire protection member which was excellent in attachment workability since invention according to claim 1 enabled it to manufacture continuously the electric wire protection member of the shape of a roll which has curliness by extrusion molding among this inventions as explained above — cost — it is effective in the ability to manufacture continuously cheap.

[0020] Moreover, since invention according to claim 2 consisted of a tank in which the interior was divided into plurality by the plenum in the equipment which manufactures an electric wire protection member, and two or more dices for fabrication attached in the direction which penetrates this tank in a longitudinal direction. In case the shape of a roll is made to carry out forming solidification of the synthetic resin extruded from the extruding press machine, it is effective in the ability to make the interior produce the curliness by residual stress simultaneously.

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

**[Drawing 1]** It is the simple cross section having shown the operation gestalt of the equipment used for the manufacturing method of this invention.

**[Drawing 2]** It is the simple front view having shown the operation gestalt of the dice for fabrication used for the manufacturing installation of this invention.

**[Drawing 3]** the electric wire protection manufactured by this invention method — it is the perspective diagram having shown an example of a member

**[Description of Notations]**

1 Electric Wire Protection — Manufacturing Installation of Member

2, 2A, 2B, 2C Tank

2a, 2d Side attachment wall

2b, 2c Septum

31, 32, 33, 34 Dice for fabrication

31a, 32a, 33a, 34a Opening

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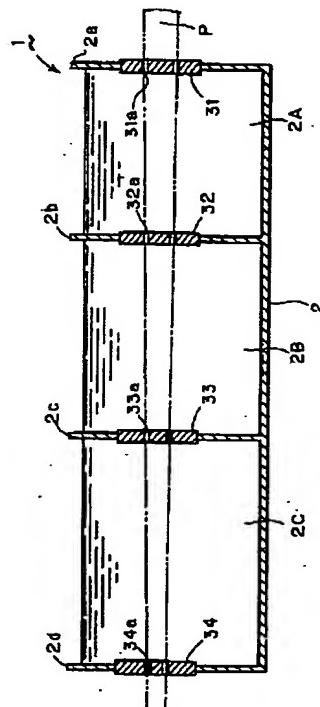
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(54)【発明の名称】電線防護部材の製造方法と該方法に使用する装置

(57)【要約】

【課題】従来の押出成形法では、取扱性に優れた電線防護部材を製造できなかったという点を改善する。

【解決手段】押出成形機のダイスから押し出された半溶融状態の合成樹脂Pを、水槽2内に所定の間隔を有して配された複数の成形用ダイス31～34に順次、送り込み、ロール状に徐々に絞り込むと共に、各水槽2A, 2B, 2C内の水で冷却することとした。このことで、合成樹脂Pの内周面と外周面とが温度差を有して冷却されるようにし、ロール状に成形された電線防護部材に内部残留応力による巻癖を生じさせるようにした。



## 【特許請求の範囲】

【請求項1】押出成形機のダイスから押し出された半溶融状態のエラストマーあるいはオレフィン系の合成樹脂を、水槽内に所定の間隔を有して配された複数の成形用ダイスに順次、送り込み、周囲の一部が重なった筒形に絞り込むと共に、この状態で徐々に冷却固化することにより、合成樹脂の内周面と外周面を温度差を有して冷却し、ロール状に成形された電線防護部材に内部残留応力による巻癖を生じさせるようにしたことを特徴とする電線防護部材の製造方法。

【請求項2】押出成形機と引取機との間に配され、押出成形機から押し出された合成樹脂でロール状の電線防護部材を連続して製造する装置であって、  
上記装置は、隔壁で内部が複数に分割された水槽と、  
水槽の側壁と前記隔壁に取り付けられた複数の成形用ダイスとで構成され、  
上記成形用ダイスには、それぞれ渦巻き状の開口部が設けられ、かつこの開口部は、押出成形機側に位置したものから引取機側に位置したものに向かって徐々にその径が小さくなるように設定されていることを特徴とする電線防護部材の製造装置。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、主として架空配電線を防護するために、その周囲に取り付けられる電線防護部材を製造する方法と、この方法に使用される装置に関する。

## 【0002】

【従来の技術】一般に架空配電線としては、被覆電線が用いられているが、この被覆電線の周囲の被覆は、屋外の種々の環境に曝され、また電柱や鉄塔などへの架設時の張力が作用したり、あるいは送電高電圧に常に曝れていたりすることから、傷み易く、万一、この被覆が破れると、作業員が触れて思わぬ事故を引き起こす虞れがあった。

【0003】そこで、作業員が触れる虞のある個所、例えば電線架設用の電柱や鉄塔の近傍では、電線の周囲に絶縁材で形成された電線防護部材を取り付けていた。この電線防護部材は、ゴムやエラストマー系の樹脂などで帯状あるいは周囲の一部が開放された筒状に形成されており、電線を巻回した状態で金具などで固定されることにより、この電線に取り付けられるものである。

【0004】ここにおいて、従来、この種の電線防護部材は、押出成形や射出成形により製造されていた。

## 【0005】

【発明が解決しようとする課題】上述した従来の電線防護部材の製造方法では、まず押出成形は、連続して作業が行えるので、製造作業能率は高いが、この方法で製造された電線防護部材は、帯状のものであり、かつ弹性を有しているので、これを電線に巻き付け、固定する作業

が一人では行き難く、取扱性に優れた電線防護部材を製造することができないという問題点があった。

【0006】また、射出成形では、電線に被せ易いように弧状に湾曲した電線防護部材を製造することができるが、この方法では連続して成形することができず、また筒形に成形した場合には、成形後に縦方向に切目を入れる作業も必要とし、製造作業能率が悪いという問題点があった。しかもこの方法で製造される電線防護部材は、一定の形状と大きさのものに限られるので、使用対象が限定されるという問題点もあった。

【0007】本発明は、上記従来の電線防護部材の製造方法が有していた問題点を解決し、作業性に優れた電線防護部材を連続して能率良く製造する方法と、この方法に使用される装置を提供しようとするものである。

## 【0008】

【課題を解決するための手段】上記の課題を解決するために、本発明のうち、請求項1記載の発明は、電線防護部材の製造方法に関し、押出成形機のダイスから押し出された半溶融状態のエラストマーあるいはオレフィン系の合成樹脂を、水槽内に所定の間隔を有して配された複数の成形用ダイスに順次、送り込み、周囲の一部が重なった筒形に絞り込むと共に、この状態で徐々に冷却固化することにより、合成樹脂の内周面と外周面とが温度差を有して冷却されるようにし、このことでロール状に成形された電線防護部材に、内部残留応力による巻癖を生じさせるようにしたことを特徴とするものである。

【0009】また、請求項2記載の発明は、押出成形機と引取機との間に配され、押出成形機から押し出された合成樹脂でロール状の電線防護部材を連続して製造する装置を、隔壁で内部が複数に分割された水槽と、水槽の側壁と前記隔壁に取り付けられた複数の成形用ダイスとで構成し、この成形用ダイスには、それぞれ渦巻き状の開口部が設け、かつこの開口部を、押出成形機側に位置したものから引取機側に位置したものに向かって徐々にその径が小さくなるように設定したことを特徴とするものである。

## 【0010】

【発明の実施の形態】以下、本発明を図示した実施の形態に基づき詳細に説明する。

【0011】図1は、本発明の電線防護部材の製造方法に使用される装置1の実施形態を示した簡略断面図である。この装置1は押出成形機(図示せず)と引取機(図示せず)との間に設置されるものであり、図示したように、隔壁2b, 2cで内部が複数に分割された水槽2の前後(図1において右側と左側)の側壁2a, 2dと、隔壁2b, 2cの同高位置にそれぞれ、成形用ダイス31, 34, 32, 33を取り付けたものである。この成形用ダイス31～34は、それぞれ渦巻き状の開口部31a～34a(図2参照)を有している。そして、この開口部31a～34aは、図1において右側のものから

左側のものに向かって徐々にその渦巻きの径が小さく、即ち、渦巻きの周方向に重なり合った部分の寸法(図2にしで示す)が大きくなるように設定されている。

【0012】なお、隔壁2c, 2dで区分された各水槽2A, 2B, 2C内の水温は、入口側(右側)から出口側(左側)に向かって徐々に低くなるように制御されている。

【0013】次に上記装置1を用いた本発明の電線防護部材Paの製造方法について説明すると、まず水槽2の入口側(図1において右側)に設置された押出成形機

(図示せず)でエラストマー系あるいはオレフィン系の合成樹脂を加熱溶融させ、これを帯状、あるいは湾曲した帯状にして連続して押し出す。そして、これを成形用ダイス31を介して水槽2A内に送り込む。このことで、押出成形機から押し出された半溶融状態の合成樹脂Pは、成形用ダイス31で略筒形に湾曲した形状に成形され、水槽2A内を通過する間に徐々に冷却され、次の成形用ダイス32に送り込まれる。そして、この成形用ダイス32でさらにその湾曲の度合いが強くなるように絞り込まれ、このようにして押出機から押し出された半溶融状態の合成樹脂Pは、各水槽2A, 2B, 2Cを通過する間に徐々に冷却固化されると共に、各成形用ダイス31, 32, 33, 34で徐々にその形状が整えられ、最終的にロール状に成形されて引取機で水槽2の出口側(図1において左側)から引き出される。そして、引き出されたロール状の合成樹脂Pを所望の位置で切断することにより、図3に示したようなロール状の電線防護部材Paが製造されるものである。

【0014】この時、本発明の製造方法では、上記の冷却の過程において、半溶融状態の合成樹脂Pが、ロール状に巻かれた状態で水槽2A, 2B, 2C内を通過するので、その外周面は水槽2A, 2B, 2C内の大量の水と接して比較的速やかに冷却されるが、ロール状に巻かれた内部に入った水は対流し難く、このことからこの個所の水は合成樹脂Pを冷却した際の熱量を受け、比較的高く保たれることとなる。このことで、ロール状に巻回された合成樹脂Pは、その内周面と外周面とが温度差を有して冷却されることとなる。そして、このように内外で温度差を有して冷却された合成樹脂Pは、内外の温度が平衡状態に達した時にその内部に熱歪みによる残留応力が生じることとなる。よって、このようにロール状に成形された電線防護部材Paは、内部残留応力による巻癖により、一層この形状を保つ性質が強くなり、展開しても直ちにロール状に巻回された元の形状に復帰しようとする。

【0015】以上のようにして、本発明方法では、内部残留応力による巻癖を有したロール状の電線防護部材Paが、押出成形により連続して製造することができるも

のである。

【0016】そして、このようにして製造された電線防護部材Paは、ロール状に巻かれて重なり合った両側端部Pa', Pa"を押し抜げて電線(図示せず)に被せると、上述の通り、この電線防護部材Paは巻癖を有しているので、電線の周囲に巻き付き、保持される。よって、この状態で外れたり、移動したりすることがないように、その周囲を図示しない固定金具などを用いて固定すれば、容易に電線の所望の位置に取り付けることができる。

【0017】このようにして、本発明方法で製造された電線防護部材Paは、電線に取り付けられ、漏電や感電事故の防止に使用されるものである。

【0018】以上のように、本発明方法で製造される電線防護部材Paは、押出成形されたものを所望の位置で切断して形成するようになっているので、所望の長さのものを容易に得ることができ、また、ロール状に電線に巻き付いて取り付けられるので、電線の径の違いを選ばず、取付作業現場における種々の条件の違いに対応することができる。

#### 【0019】

【発明の効果】以上説明したように、本発明のうち、請求項1記載の発明は、巻癖を有するロール状の電線防護部材を押出成形により、連続して製造できるようにしたので、取付作業性に優れた電線防護部材を、コスト低廉に連続して製造することができるという効果がある。

【0020】また、請求項2記載の発明は、電線防護部材を製造する装置を、隔壁で内部が複数に分割された水槽と、この水槽を横方向に貫通する方向に取り付けられた複数の成形用ダイスとで構成したので、押出成形機から押し出された合成樹脂をロール状に成形固化させる際に、その内部に残留応力による巻癖を同時に生じさせることができるという効果がある。

#### 【図面の簡単な説明】

【図1】本発明の製造方法に使用される装置の実施形態を示した簡略断面図である。

【図2】本発明の製造装置に使用される成形用ダイスの実施形態を示した簡略正面図である。

【図3】本発明方法で製造された電線防護部材の一例を示した斜視図である。

#### 【符号の説明】

1 電線防護部材の製造装置

2, 2A, 2B, 2C 水槽

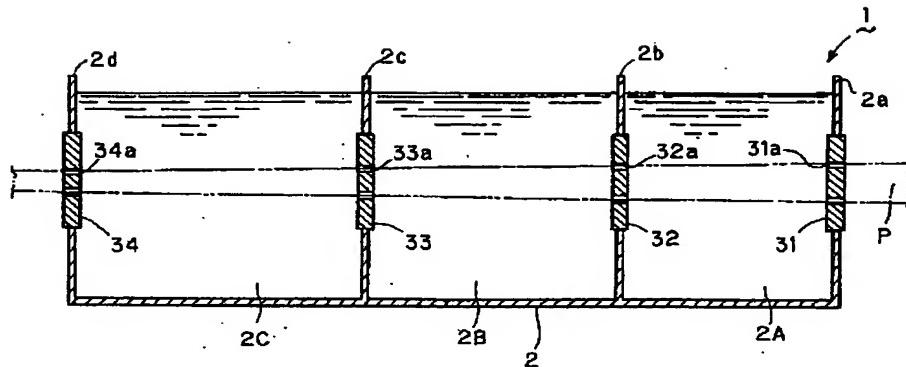
2a, 2d 側壁

2b, 2c 隔壁

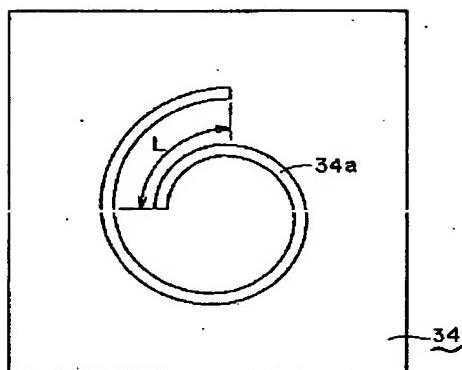
31, 32, 33, 34 成形用ダイス

31a, 32a, 33a, 34a 開口部

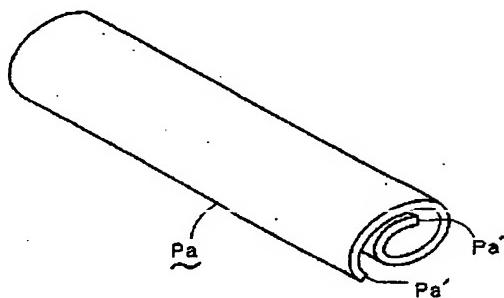
【図1】



【図2】



【図3】




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